METHOD ACCURACY DESCRIPTION (MAD) (VERSION 6.1)
INFORMATION CODING STANDARDS
FOR THE
U.S. ENVIRONMENTAL PROTECTION AGENCY'S
LOCATIONAL DATA POLICY (LDP)

Prepared by the LDP Sub-Work Group
of the Regional GIS Work Group

BACKGROUND:

On April 8, 1991 the Deputy Administrator signed the Agency's Locational Data Policy (LDP), IRM Policy Manual 2100 Chapter 13, requiring geographic coordinates and associated method, accuracy, and description codes (MAD) for all environmental measurements collected by EPA employees, contractors and grantees (Appendix A). A key premise of this policy is that secondary use of these data in geographic information systems (GIS) and statistical mapping programs are significant to the overall mission of the Agency. To facilitate the integration of data into these systems, it is important that coding of geographic coordinates and associated attributes be standardized.

PURPOSE:

This document presents the information coding (MAD version 6.1) standards for 1) the nine required fields and 2) nine additional recommended fields.

REQUIRED LOCATIONAL DATA FIELDS

1. Latitude
2. Longitude
3. Method of collection
4. Accuracy value & unit
5. Description category
6. Vertical Measure
7. Horizontal Datum
8. Source Scale
9. Point-Line-Area

RECOMMENDED/OPTIONAL LOCATIONAL DATA FIELDS

1. Date of collection
2. Source
3. Description Comments
4. Vertical Measure Method of Collection
5. Vertical Measure Accuracy
6. Vertical Datum
7 Verification
8 Data-Point-Sequence
9 Description-Sequence

REQUIRED LOCATIONAL DATA FIELDS

NAME: Latitude

DEFINITION: Value for latitude in decimal degrees

DATA ELEMENT LENGTH: 8 numeric (signed)
9 (2) .9 (6)s

EDITS: Must be a valid latitude.
+ = North
- = South

RETRIEVAL CONSIDERATIONS: (+/-) dd.xxxxxx

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NAME: Longitude

DEFINITION: Value for longitude in decimal degrees

DATA ELEMENT LENGTH: 9 numeric (signed)
9 (3) .9 (6)s

EDITS: Must be a valid longitude.
+ = East
- = West

RETRIEVAL CONSIDERATIONS: (+/-)ddd.xxxxxx

REQUIRED LOCATIONAL DATA FIELDS

NAME: Latitude/longitude method of collection.

DEFINITION: Describes method used to determine the latitude/longitude. This represents the primary source of the data.

DATA ELEMENT LENGTH: 2 alphanumeric

EDITS: Must be a valid latitude/longitude method of collection code.

RETRIEVAL CONSIDERATIONS: Either the code or the 72-character alphanumeric description may be retrieved.

CODE	DESCRIPTION
A1	ADDRESS MATCHING-HOUSE NUMBER
A2	ADDRESS MATCHING-BLOCK FACE
A3	ADDRESS MATCHING-STREET CENTERLINE
A4	ADDRESS MATCHING-NEAREST INTERSECTION
A5	ADDRESS MATCHING-PRIMARY NAME
A6	ADDRESS MATCHING-DIGITIZED
AO	ADDRESS MATCHING-OTHER
C1	CENSUS BLOCK-1990-CENTROID
C2	CENSUS BLOCK/GROUP-1990-CENTROID
C3	CENSUS BLOCK TRACT-1990-CENTROID
CO	CENSUS-OTHER
G1	GPS CARRIER PHASE STATIC RELATIVE POSITIONING TECHNIQUE
G2	GPS CARRIER PHASE KINEMATIC RELATIVE POSITIONING TECHNIQUE
G3	GPS CODE MEASUREMENTS (PSEUDO RANGE) DIFFERENTIAL (DGPS)
G4	GPS CODE MEASUREMENTS (PSEUDO RANGE) PRECISE POSITIONING SERVICE
G5	GPS CODE MEASUREMENTS (PSEUDO RANGE) STANDARD POSITIONING SERVICE SA OFF
G6	GPS CODE MEASUREMENTS (PSEUDO RANGE) STANDARD POSITIONING SERVICE SA ON
I1	INTERPOLATION-MAP
I2	INTERPOLATION-PHOTO
I3	INTERPOLATION-SATELLITE
IO	INTERPOLATION-OTHER
L1	LORAN C
P1	PUBLIC-LAND-SURVEY-QUARTERING
P2	PUBLIC-LAND-SURVEY-FOOTING
S1	CLASSICAL SURVEYING TECHNIQUES
Z1	ZIPCODE-CENTROID
UN	UNKNOWN

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NAME: Latitude/longitude accuracy value & units

DEFINITION: Describes the accuracy value as a range (+/-) of the latitude and longitude and the reporting units. The LDP requires that only the least accurate measurement be recorded, regardless of whether it is for longitude or latitude.

DATA ELEMENT LENGTH: **VALUE:** Up to 6 numeric - use floating point

UNITS: 1 alphanumeric

EDITS: **UNITS** must be a valid latitude and longitude accuracy unit code.

RETRIEVAL CONSIDERATIONS: Accuracy value and units must be retrieved together. Value may be preceded by a +/- sign. Units may be retrieved either as the code or the 10 alphanumeric description. The two fields, value and unit, will be retrievable as one in the form:

+/- value unit

For example, if the value field was entered as 10.0 and the unit field was entered as 4, the retrievable data would appear as: +/- 10.0 METERS

UNIT CODE	DESCRIPTION
1	DEGREES
2	MINUTES
3	SECONDS
4	METERS
5	FEET
6	KILOMETERS
7	MILES

REQUIRED LOCATIONAL DATA FIELDS

NAME: Latitude/longitude description category

DEFINITION: Describes the category of feature referenced by the latitude and longitude.

DATA ELEMENT LENGTH: 2 alphanumeric

EDITS: Must be a valid latitude/longitude description category code.

RETRIEVAL CONSIDERATIONS: Either the code or the 30-character alphanumeric description may be retrieved.

CODE	DESCRIPTION
PG	PLANT ENTRANCE (GENERAL)
PP	PLANT ENTRANCE (PERSONNEL)
PF	PLANT ENTRANCE (FREIGHT)
AS	AIR RELEASE STACK
AV	AIR RELEASE VENT
ST	STORAGE TANK
WR	WATER RELEASE PIPE
SP	LAGOON OR SETTLING POND
LW	LIQUID WASTE TREATMENT UNIT
AE	ATMOS. EMISSIONS TRTMNT UNIT
SD	SOLID WASTE TRTMNT/DISP. UNIT
SS	SOLID WASTE STORAGE AREA
LF	LOADING FACILITY
LC	LOADING AREA CENTROID
PU	PROCESS UNIT
PC	PROCESS UNIT AREA CENTROID
AB	ADMINISTRATIVE BUILDING
FC	FACILITY CENTROID
NE	NE CORNER OF LAND PARCEL
SE	SE CORNER OF LAND PARCEL
NW	NW CORNER OF LAND PARCEL
SW	SW CORNER OF LAND PARCEL
CE	CENTER OF FACILITY
WL	WELL
WA	WELL PROTECTION AREA
WM	WATER MONITORING STATION
AM	AIR MONITORING STATION
OT	OTHER (Describe or name in description comments)
UN	UNKNOWN

REQUIRED LOCATIONAL DATA FIELDS

NAME: Vertical Measure

DEFINITION: Provides vertical component of measured point. If no vertical component, leave blank

DATA ELEMENT LENGTH: 7 numeric
9 (5) .9 (2)

EDITS: -9999 < value < 99999

RETRIEVAL CONSIDERATIONS: Retrievable as a value in meters.

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NAME: Horizontal Datum

DEFINITION: Describes the reference datum of the latitude and longitude.

DATA ELEMENT LENGTH: 1 alphanumeric

EDITS: Must be a valid latitude/longitude datum code.

RETRIEVAL CONSIDERATIONS: Either the code or the 7-character alphanumeric description may be retrieved.

CODE	DESCRIPTION
1	NAD27
2	NAD83
O	OTHER
U	UNKNOWN

REQUIRED LOCATIONAL DATA FIELDS

NAME: Source Scale

DEFINITION: Describes the scale of the source used to determine the latitude and longitude.

DATA ELEMENT LENGTH: 1 alphanumeric

EDITS: Must be a valid latitude/longitude scale code.

RETRIEVAL CONSIDERATIONS: Either the code or the 20-character alphanumeric description may be retrieved. Data can be entered as a Range or a Discrete value.

CODE	DESCRIPTION
Ranges -	
1	> = 1:500
2	1:501 - 1:5,000
3	1:5,001 - 1:10,000
4	1:10,001 - 1:15,000
5	1:15,001 - 1:20,000
6	1:20,001 - 1:25,000
7	1:25,001 - 1:50,000
8	1:50,001 - 1:100,000
9	< 1:100,000
Discrete values -	
A	1:10, 000
B	1:12, 000
C	1:15, 840
D	1:20, 000
E	1:24, 000
F	1:25, 000
G	1:50, 000
H	1:62, 500
I	1:63, 360
J	1:100, 000
K	1:125, 000
L	1:250, 000
M	1:500, 000
N	NONE
O	OTHER
U	UNKNOWN

REQUIRED LOCATIONAL DATA FIELDS

NAME: Point-Line-Area

DEFINITION: A flag to indicate whether the lat/long data represents a point (P), or multiple points on a line (L), or an area (A). Defaults to point.

DATA ELEMENT LENGTH: 1 alphanumeric

EDITS: Must be a valid point, line, or area code.

RETRIEVAL CONSIDERATIONS: Either the code or the 5 alphanumeric description may be retrieved.

CODE	DESCRIPTION
P	POINT
L	LINE
A	AREA

RECOMMENDED/OPTIONAL LOCATIONAL DATA FIELDS

NAME: Latitude/longitude source

DEFINITION: Describes the party responsible for collecting or otherwise providing the latitude and longitude.

DATA ELEMENT LENGTH: 2 alphanumeric

EDITS: Must be a valid latitude/longitude source code.

RETRIEVAL CONSIDERATIONS: Either the code or the 18-character alphanumeric description may be retrieved.

CODE	DESCRIPTION
R1	EPA REGION 1
R2	EPA REGION 2
R3	EPA REGION 3
R4	EPA REGION 4
R5	EPA REGION 5
R6	EPA REGION 6
R7	EPA REGION 7
R8	EPA REGION 8
R9	EPA REGION 9
R0	EPA REGION 10
01-55	(USE FIPS CODE FOR STATES)
RE	REGULATED ENTITY
CR	CONTRACTOR
TR	TRIBE
HQ	EPA HEADQUARTERS
DB	DUN & BRADSTREET
PV	PRIVATE
FA	OTHER FEDERAL AGENCY
OT	OTHER
UN	UNKNOWN

RECOMMENDED/OPTIONAL LOCATIONAL DATA FIELDS

NAME:	Latitude/longitude date of collection
DEFINITION:	Describes the date when the latitude and longitude were researched or collected.
DATA ELEMENT LENGTH:	Date (yyyymmdd)
EDITS:	Must be a valid date.
RETRIEVAL CONSIDERATIONS:	Retrieve as mm/dd/yyyy.

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NAME:	Latitude/longitude description comments
DEFINITION:	Provides for additional comments relating to the latitude, longitude and vertical component. For example, this field could be used to store information about the collection of the data, the post processing of the data (if GPS were involved), or to describe in more detail what feature of the facility is represented by the coordinates.
DATA ELEMENT LENGTH:	150 alphanumeric
EDITS:	None.
RETRIEVAL CONSIDERATIONS:	Retrievable in five 30 alphanumeric segments.

RECOMMENDED/OPTIONAL LOCATIONAL DATA FIELDS

NAME: Vertical Measure Method of Collection. **Required** if vertical measure determined.

DEFINITION: Describes the means used to determine the vertical measure.

DATA ELEMENT LENGTH: 2 alphanumeric

EDITS: Must be a valid vertical measure method of collection code.

RETRIEVAL CONSIDERATIONS: Either the code or the 72-character alphanumeric description may be retrieved.

CODE	DESCRIPTION
A1	ALTIMETRY
G1	GPS CARRIER PHASE STATIC RELATIVE POSITIONING TECHNIQUE
G2	GPS CARRIER PHASE KINEMATIC RELATIVE POSITIONING TECHNIQUE
G3	GPS CODE MEASUREMENTS (PSEUDO RANGE) DIFFERENTIAL (DGPS)
G4	GPS CODE MEASUREMENTS (PSEUDO RANGE) PRECISE POSITIONING SERVICE
G5	GPS CODE MEASUREMENTS (PSEUDO RANGE) STANDARD POSITIONING SERVICE SA OFF
G6	GPS CODE MEASUREMENTS (PSEUDO RANGE) STANDARD POSITIONING SERVICE SA ON
L1	PRECISE LEVELING FROM A BENCH MARK
L2	LEVELING BETWEEN NON BENCH MARK CONTROL POINTS
L3	TRIGONOMETRIC LEVELING
P1	PHOTOGRAMMETRIC
S1	CLASSICAL SURVEYING TECHNIQUES
T1	TOPOGRAPHIC MAP INTERPOLATION
OT	OTHER

NAME: Vertical Measure Accuracy

DEFINITION: Describes the accuracy of the vertical measure as a range (+/-) in meters. **Required** if vertical measure determined.

DATA ELEMENT LENGTH: 5 alphanumeric
9 (3) .9 (2) signed
Value will be preceded by a +/- sign.

EDITS: Must be in meters

RETRIEVAL CONSIDERATIONS: Retrievable as a value in meters

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NAME: Vertical Datum

DEFINITION: Describes the reference datum for the vertical measure. **Required** if vertical measure determined.

DATA ELEMENT LENGTH: 1 alphanumeric

EDITS: Must be a valid vertical datum code.

RETRIEVAL CONSIDERATIONS: Either the code or the 29 alphanumeric description may be retrieved.

CODE	DESCRIPTION
1	NAVD88
2	NGVD29
3	ELEVATION FROM MEAN SEA-LEVEL
4	LOCAL TIDAL DATUM
O	OTHER
U	UNKNOWN
N	NOT APPLICABLE

RECOMMENDED/OPTIONAL LOCATIONAL DATA FIELDS

NAME: Latitude/longitude verification

DEFINITION: Indicates if the latitude and longitude has been verified by EPA staff, grantees or contractors through a given process.

DATA ELEMENT LENGTH: 1 alphanumeric

EDITS: Must be a valid latitude/longitude verification

RETRIEVAL CONSIDERATIONS: Either the code or the 50-character alphanumeric description may be retrieved.

CODE	DESCRIPTION
A	PROXIMITY TO POLYGON CENTROID (ZIP CODE)
B	PROXIMITY TO POLYGON CENTROID (COUNTY)
C	PROXIMITY TO POLYGON CENTROID (OTHER)
D	PROXIMITY TO ALTERNATIVE FACILITY COORDINATE
E	POINT IN POLYGON (ZIP)
F	POINT IN POLYGON (COUNTY)
G	POINT IN POLYGON (OTHER)
H	VERIFIED RELATIVE TO MAP FEATURES (1:100K OR TIGER)
I	VERIFIED RELATIVE TO MAP FEATURES (1:24K)
J	VERIFIED RELATIVE TO MAP FEATURES (OTHER)
K	GROUND TRUTH CONDUCTED
L	VERIFIED, UNKNOWN METHOD
M	NOT VERIFIED

RECOMMENDED/OPTIONAL LOCATIONAL DATA FIELDS

NAME: Data-Point-Sequence

DEFINITION: A sequential number to indicate the order in which points on a line or area are connected. For an area, the maximum point is connected to the first. **Required** if feature is polygonal or linear

DATA ELEMENT LENGTH: 3 numeric

EDITS: 0 < value < 999

RETRIEVAL CONSIDERATIONS: None

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NAME: Description-Sequence

DEFINITION: A sequential number to differentiate between main facility, subfacility, or other entities indicated in the description field that may fall under one facility id or monitoring site id, etc. **Required** if multiple entities exist under the same unique identifier.

DATA ELEMENT LENGTH: 2 numeric

EDITS: 0 < value < 99

RETRIEVAL CONSIDERATIONS: None

REFERENCES:

U.S. Environmental Protection Agency (1991), *Appendix E -"Standard Operating Procedures to Determine Site Latitude and Longitude Coordinates*" in Guidance for Performing Preliminary Assessments under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). (OSWER, EPA/540-G-91/013).

U.S. Environmental Protection Agency (1992), *Locational Data Policy Guidance - Guide to Selecting Latitude/Longitude Collection Methods*. (OARM, EPA/220 B-92-008, March 1992).

U.S. Environmental Protection Agency (1992), *Locational Data Policy Guidance -Guide to the Policy*. (OARM, EPA/220 B-92-008, March 1992).

U.S. Environmental Protection Agency (1992), *GIS Technical Memorandum 3: Global Positioning Systems Technology and Its Application in Environmental Programs*. (ORD, EPA/600-R-92-036, February 1992).